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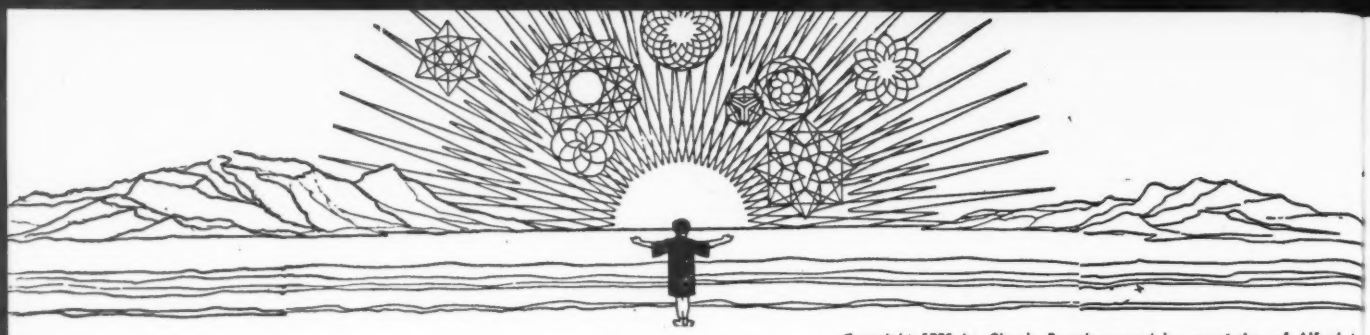

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MAIN CURRENTS
IN MODERN THOUGHT

A cooperative journal to promote the free association of those working toward the integration of all knowledge through the study of the whole of things, Nature, Man, and Society, assuming the universe to be one, dependable, intelligible, harmonious.

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On the Cover: A typical representation of the living cell, a model reproduced here through the courtesy of the Upjohn Company.

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MAIN CURRENTS IN MODERN THOUGHT is published to call attention to significant contributions to learning currently being made in the multiple fields, relating these advances to each other and to classical and contemporary views of Eastern, European and American thinkers. It is designed to save time for the reader by providing a vantage-ground from which the whole world of knowledge may be surveyed and kept in proportion as it moves toward integration. Its editors assume that the principles of art, the universals of philosophy, the laws of Nature and Man as formulated by science, and the truths of comparative religion, can be orchestrated into a harmonic, meaningful, ethical body of teachings which can and should be made the central core of curricular study in the educative process at all levels. Contributors to MAIN CURRENTS enjoy full liberty of opinion and expression in these pages.
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A BASIS FOR A THEORY OF LAW*

H. S. Burr

Natural Law as the Source of Universals for Society and for the Individual

LAW means many things to many people, but to most of us it means the written law, the body of rules and regulations erected by legislatures and courts. Also written, but established by religious bodies, is the moral law. Both are attempts by human beings to control human behavior; in the first instance of others, and in the second, of ourselves. Both result from the fact that the problem of human relations remains unsolved. Man still has no clear idea of who or what he is, what he is here for, what his true relationship is to the Universe in which he finds himself. We seem to be very little better off than was primitive man. We still fight each other individually and collectively. All this in spite of pages on pages of written law.

An adjunct to the innumerable rules and regulations found in books is the living law; the rules of conduct individuals and groups develop as a result of some partially envisaged philosophy of living. There is no necessary relationship between these two attempts to control behavior. No central theory exists from which these controls can be deduced. It is not surprising that there should be so much confusion, so much divergence, so much conflict. What is illegal in the Western world may be permissible in Eastern civilization. The good or right behavior in central Africa is wrong in London, Paris, or New York.

It can be argued that at the heart of the problem is the sense of values. But who among us can define the good, the true, and the beautiful in such terms as to be generally accepted or useful throughout the world? Values are largely culturally determined and, therefore, differ as widely as the backgrounds from which they stem. And yet it has been argued forcefully by theologians, philosophers, and teachers that man is man wherever you happen to find him. Man is man, whether he be found as an aborigine or as the best creative mind of the best civilization we know.

There should be some universals, therefore, some general properties that characterize all humans. Are there such? Opinions differ. We simply do not know, again because we have not answered the age-old question, "What Is Man, That Thou Art Mindful Of Him?" While it cannot be gainsaid that all humans are physically alike, it is equally true that every individual exhibits characteristics that set him apart from all others. Why is this? From the dawn of history man has attempted to answer this question by asserting that while physically he is like all others, nevertheless, he is endowed with a soul, a spirit, which is uniquely different from that of others and which imbues the typical form with an extra-natural, a mystical character. This is the dualistic approach, almost universally accepted, that man is a special creation of a Divine Being.

And yet, can this be true? For it assumes that from some source outside the living organism, a something which cannot be seen, heard or handled, which defies definition, sits upon the individual, guiding and directing all its activities. Thus there appears the supernatural, the existence of forces, of controls, over and above the physical or material. Thus, the Universe is not a unity but, rather, a diversity. Man, then, is a special creation, in the Universe but not of it; a physical system to be sure but, nevertheless, controlled by factors not a part of the Universe, but superior to it. And yet these forces which accomplish this cannot be shown to exist in space, or in time, or to involve energy transformations. How, then, can they affect the physical body which does occupy space, does exist in time, and does involve energy transformations? How can this be when everything else we know about the Universe makes it abundantly clear that every single entity exhibits the existence of definable law and a recognizable order? The Universe is a place of law and order which the mind of man can discover and, hopefully, understand.

TO assume that there are forces which are supernatural is to denigrate the Universe. This notion has arisen out of the vanity and ignorance of

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man. It ignores the Natural Law, the Law of the Universe, the law which determines the stars in their courses and without which not a single thing we recognize, including ourselves, could exist for the fraction of a second. It would substitute for the law that keeps the Universe together, man-made dicta that perhaps serve pragmatically in the absence of knowledge. To some degree, this might be useful, for our knowledge is little and our ignorance great. Possibly a few man-made laws can serve as crutches to keep us from falling while we struggle to gain more knowledge and understanding.

Both the Written Law and the Moral Law, moreover, are negativistic, full of must-nots and do-nots. Man, in his egotism, is quite sure he knows what the other fellow should do, or not do. He knows because he believes that he is endowed with free-will, the ability to make choices, discriminations, decisions and be guided, he hopefully believes, by some Higher Power. Hence, he examines the Written Law of the past and bends it to his idea of what is right; or he studies the long history of that revealed law which has come to prophets and sages over the years, and draws up a set of regulations which he proceeds to impose on others.

Looked at from this point of view, man-made law has not been particularly successful. It is highly doubtful if any real advance has been made in the control of human behavior since the beginning of recorded history, and for a good and sufficient reason. We have been attacking this crucial problem from the wrong angle. We have been sold a bill of goods by religionists and lawyers alike. Being unsure of ourselves, being well-aware of our ignorance and lack of understanding, we have bowed down to those assertive ones who claimed to have had the answers. The result has been confusion worse confounded; hot wars, cold wars, crime and delinquency until, for many, there is no longer any reason for optimism.

But this is absurd. Man has survived all these crippling attitudes because he is the result of the operation of Natural Law, the Law of the Universe, the verifiable universals of the cosmos. It is very easy to forget, or to over-look and to take for granted the fact that we are what we are, that we can survive this muddle only because our bones and muscles, our hearts and lungs, our nerves and brains have resulted from the action of forces which are the Natural Law and Order of the Universe. Man did not dream up this Law. He discovered it, or at least he has discovered some of it. The Universe exhibits law and order; so does man. Were this not so, we could not tell a cat from a dog, a man from a monkey, or one human being from another. In other words, the Universe and everything in it exhibits a pattern of organization, a characteristic arrangement of the component entities. There are many who maintain that this is sheer accident, that the Universe is chaos, that the only order in it is that which is put into it by the mind of man. Some have held, and still hold, that it is much easier to grasp the idea of a Universe of chaos than it is one of Law. There are so many unknowns in an orderly Universe that it is, in all probability, impossible ever to know or to understand it. So it is held:— Why bother? Man has a brain; let him put order into chaos. True, man has a brain or, perhaps more correctly, man is a brain. He is a marvellously constructed entity. Because his brain is made up of more than ten billion components, it has capacities that endow each and everyone of us with miraculous abilities, abilities so numerous, so phenomenal, that only very rarely does any one individual ever realize more than a fraction of his potentials. Perhaps it is because of this enormous potential that man has decided that he, like Papa, "knows best." But he forgets that he did not make his body or his brain. He did not design the fabric of bone and muscle. He did not devise the heart and the transport system of blood vessels. He did not create the brain, the neuronal activity of which constitutes the mind. Not only has he not done so; there is little sign that he ever can, unless he learns a great deal more about the Natural Law which has made him.

It follows from all this that the behavior of man is in every sense of the word the describable activity resulting from the patterned organization of the nervous system, the product of Natural Law. He is not the result of the fevered imagination of himself or of other men. He is a designed system. His behavior is the direct consequence of that design.

IT would seem sensible, then, to seek the answer to the problem of the relationship of one man to another in the forces which have made man. One needs to examine the long story of the evolution of living things on this earth to perceive that, in spite of what looks like a great deal of fumbling, of trial and error, the process has been slowly but surely developing more and more complicated living beings. Along with the complication there has been, quite obviously, a steady increase in individuality. It is well-nigh impossible to tell one amoeba from another. All birds in a flock look alike. We get so we can recognize our pet dog, knowing full-well that he is not the neighbor's. But when we get to man, there is no question of his individual uniqueness. No two of us are alike. In fact, we differ from each other more than any other two things in the Universe.

This clearly argues that evolution has been going somewhere. It has a goal; it has direction — the development of the unique individual — man. He is the product of the teleological component in the design of the Universe.

It would seem logical, therefore, that the problem of Human Relations should be attacked by the same methods which have made it possible for man to acquire an enormous control over his physical environment. We have learned much about the operation of the Natural Law in earth, and sky, and sea. By putting this body of Law to work we make toasters, washing-machines, automobiles, airplanes, ships and submarines, to say nothing of computers which, in some ways, mimic the activities of the brain. Man has been able to accomplish this because he has learned something of the forces and laws that operate in rocks and metals, in air and water, in atoms and molecules. Man, from the beginning, has been a designer of tools, instruments, and machines, all of which has made it easier for him to stay alive in a very complex environment. In many senses of the word, he has conquered the earth and, currently, is striving to add space, or the rest of the Universe, to his armamentarium. It is not surprising that he is rather set up by all his successes. In his vanity, he thinks that HE has done all these things. Who is this HE? Whoever he is, he has not lifted himself by his own bootstraps. He has not created these manifold and wondrous things. He cannot pat himself on the back and cry, "What A Great Man Am I." And yet, that is the basic assumption underlying the living law, providing the very foundations by which we live. Many believe that all this has been accomplished through man's unaided will to achieve. But, how has this come about? If you believe in ghosts, witches, gremlins and God-given souls which may, on occasion, dwell for a period of time in a physical body, then man is a creative giant who can command the wind and the waves to do his will. But can he? Obviously, he cannot. He did not invent the atom; he discovered it. He did not create the law of gravity. He did not define the laws of intermolecular action. He uncovered all these things in the world around him. They were there, exhibiting the operation of the law and order of the Universe.

How was this accomplished? The stock answer, of course, is that man has a mind, that he is a thinking, reasoning being. But what is this mind that it can accomplish all these things? If you hold that mind is some supernatural something which, from without, guides the destiny of the individual, then you must throw up your hands, for this is the basic assumption underlying all of our current failures. This kind of a mind cannot be studied, for it does not exist in fact. We know of it only through the interpretation a mind makes of the actions or behavior engendered by other minds. Two unknowns and no equation. The concept of a supernatural "mind" leads to nothing but futility and that is about where we are when we try to solve the problem of human relations through the activities of an extra-material mind. This sounds hopeless or pessimistic, but it need not be if we look at this from a different angle. Admittedly, man has accomplished great things in the material world. Many of us have "never had it so good." Parts of the world have an unbelievable standard of material living. Much of this has come about in a few centuries, a droplet of time in the immensity of Universal time.

The answer, of course, is clear. It is the mind of man that has done these things. But, most emphatically, not the supernatural mind. The mind to which credit must be given is the mind which is the correlate of the activity of the billions of nerves which, in critically determined arrangements, comprise the nervous system of man. In other words, the mind of man is the correlate of the activity of nerve cells arranged in a particular pattern of organization. Just so the redness of the rose is the verifiable correlate of the particular arrangement of the chemical constituents of the rose petal. When two elements are united in a unique relationship, new qualities appear which are not present in either component. So, when billions of entities, the nerve cells, are combined in specific patterns, innumerable qualities, miraculous qualities, attend their activities.

But these entities are not patterned by chance. The nerve cells themselves are organized collections of a very few simple chemicals. The living substance of a nerve is incredibly complex; a mixture of these elementary particles so organized, so multifarious that we still know distressingly little of the details. But we do know that the simple component chemicals are related to each other in lawful and understandable ways. The nerve cells are the consequences of the operation of rigid, predictable laws of the Universe — the Natural Law.

In like manner, nerve cells are related to each other by precise, definable, powerful laws. It follows, therefore, that the nervous system of man, as well as all other parts of his physical being, are the product of Natural Law. Moreover, since mind is the qualitative attribute of the law-determined nervous system, then behavior, which is the result of the activity of that nervous system, must also be law-determined. It would seem only intelligent, then, to examine human behavior as also law-determined.

THIS must mean, quite obviously, that the answer to the question of why we do what we do should be sought by the use of the same methods man has employed in the conquest of the material world. The procedure has been somewhat deified by the term, "The Method of Science." As a matter of fact, this method is followed, in general, by all of us in adjusting to our environment. The memories of our experience and that of others lead us to guess that if we make a particular assumption, certain consequences will follow, so we bet on the

Yankees or buy Standard Oil. If the results pan out, we hold that our guess was good. So the musician composes his symphony, the writer completes his book, the artist paints his picture. The guesses are tested pragmatically in the resulting experience. Science does the same thing, but adds the very important step of first working out as many of the logical consequences of the assumption or guess as possible, subjecting the results to experimental verification. In the physical world, adequate controls of the experiments can be achieved. In the world of living things, this is not so easy, but it does not mean that it must not be attempted. The success of science in the analysis of material things has been so phenomenal that there is every reason to believe that equal achievements can be attained in the world of human beings.

As a matter of fact, we have learned a great deal already about living things, but there is much to be done. The scientific approach to evolution makes it abundantly clear, nevertheless, that man is an animal evolved from primitive living stuff after eons of conditioning in the slowly changing physical enviroment. But this slowly changing development of increasing numbers of cells and a concomitant increase in complexity, has had direction. It has been a teleological process in the course of which a steadily growing dissimilarity between individuals has appeared. Quite obviously, evolution has evidenced a purpose — the development of unique human individuals. Such an end result has been reached by the relatively simple process of increasing the numbers of cells with the consequent appearance of new qualitative attributes. Curiously enough, this enlargement of numbers and the, therefore, increased complexity has been most strikingly exemplified in the nervous system, that organ system in all the backbone animals which, unquestionably, controls behavior. In the process, moreover, very little has been replaced or lost. As a result, the human nervous system retains elements of the controlling mechanisms of all animals from fish to monkeys.

Between monkeys and man there is a rather extraordinary chasm. Man has all the parts of an infrahuman primate but, because in addition he has an almost overwhelming increase in the cells of the grey cortex of the brain, he suddenly turns up with a mind. But he still has elements of fish, bird, and monkey in the controlling mechanism. This is evidenced by the appearance of these age-old behavior patterns when the brain of man is damaged.

It must not be forgotten, though, that the mind of man is correlated to the activity of the nerve cells of the brain and that this activity is never independent of the operation of all the old inherited controls. Man exhibits the same kind of reflexes as appear in fish, birds, and monkeys. He has the same kind of control of all chemical factories of the body which supply energy for activity. The automatic integration of movements into the complex and rigidly controlled, stereotyped methods of progression, such as distinguish the walking or running of man, of monkey, of dog, appear in man's nervous system as part of his developmental and evolutionary history. Yet each step upward in number-determined complexity brings with it new qualitative attributes. So do we distinguish the movements of a cat from those of a dog. And in man the enormous increase in motor activities exhibited in writing, speaking, tool making and in the incredibly complicated motions of the musician, the dancer and the scientist, all arise as a result of nerve impulses travelling through the grey matter of the cortex, down through the rest of the nervous system to command the allegiance of the older mechanisms in the synthesis of new ways of doing things.

SO it appears that man is a reflex animal, an automatic beast, and a mind-controlled being. He possesses quick reflexes, he glories in automatic or instinctive or emotional behavior, and he prides himself that he can rise above all these as a rational thinker. To be sure, he is all these, but the trouble arises when he insists that he can be rational without emotion, instincts, or reflexes. No activity, no behavior, is possible without the intimate cooperation of all three of these built-in, inherited mechanisms. None the less, it is equally clear that the cortex can modify, to some extent, the reflex and automatic patterns. But there are many occasions when a reflex refuses to be dominated, when the primitive, emotional, inherited patterns surge above the rational. Also there are times when the cortex demands responses of the primitive nervous system which cannot be elicited.

It is little wonder, then, that human behavior is fraught with conflict, confusion, and anxiety. It is nothing short of a miracle that so many manage to maintain some reasonable semblance of balance. The explanation of why these things should be is found in the pattern of organization of the cortex. All other parts of the nervous system have inherited work to do, in all probability not changed by education or experience, except possibly for some increase of efficiency. But the cortex has new properties. It can compare and discriminate minute differences. It can combine, coordinate, integrate great numbers of incoming bits of information. It can store, perhaps indefinitely, all sorts of stimuli in memory banks. It can combine odd bits of knowledge in new and hitherto unsuspected ways. Out of this creative imagination appear ideas, ideals, symbols, new explosions, as it were, in living things, for an idea is just as adequate a stimulus as a flash of light or a clap of thunder. As a matter of fact, some ideas have

had revolutionary consequences, both good and bad, for mankind.

It follows, therefore, that if man is to be balanced, both within and without, if man is ever going to get along with himself and the rest of mankind, to say nothing of the Universe, he (his nervous system!) must learn to discriminate and select the bits of information which enter and lodge permanently in his cortex. But it must not be forgotten that the outcome of cortical activity must operate through primitive automatic and reflex mechanisms. It must work with them, not against them. The crucial point here is that all these activities are the product of Natural Law. To ignore or overlook this aspect of man's nervous system, his behavior, is as absurd as it would be to defy the law of gravitation and jump off the roof of the Empire State Building, or to drive an automobile into a stone wall.

There is no reason to believe that man can defy the Natural Law of the nervous system without equally disastrous results. And yet that is exactly what man has been doing since he appeared on this earth. Because the results have been disastrous, instead of seeking a solution in the way the Universe works, he endows himself with supernatural powers and invents all kinds of regulations designed, he hopes, to make other people behave. One would think that the cortex, itself a product of Natural Law, would perceive a better way of handling the problem.

Since every human being is uniquely individual, moreover, it should be obvious that a satisfactory solution for one would not apply necessarily to another. Yet the written and the moral laws do just exactly that, ignoring the clear implication of the purpose of evolution. The law of the Universe has created the unique individual. Man-made law has tried to reduce us to commonplace man.

THERE are universals, of course, in the Natural Law. So the business of man-made law should be to search for the universals in behavior, to build a solid foundation upon which the uniqueness of each individual can be erected with the certainty of adequate results. Not one of us knows enough to predict how this could be done, or what the outcome would be. Not one of us knows enough to define what bits of information should reach the storehouses of memory and what should be eliminated. For we do not know what is good. We have fixed ideas about the bad, and there is no universal character to our value judgment, because we set up our own standards without reference to the Universe in which we find ourselves. Science has universals that are true here and in outer space. Law, written or living, has no such generalities. There is only one measure of right. The right, the good, is what is true. The bad grows out of our ignorance. Since we do not know all there is to know, moreover, the true grows and changes with knowledge. So will the good. Like the Universe, this is a growing, changing process. As our knowledge and understanding of the Natural Law grows, so will our capacity for balanced individual and social adjustment change, develop, and succeed; so will the Written Law be reworked into a system by means of which behavior can first be understood and then helped. This is the only way in which law, as we know it can, taking a leaf from Science, develop into a useful tool for the solution of the problem of human relationships.

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CAUSALITY

Henry Margenau

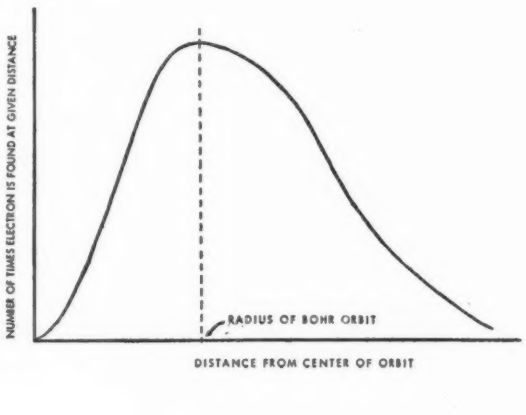
Scientific Indeterminancy and Human Freedom—an Appraisal

THE philosophy of materialism, which was predicated upon classical mechanics, received its prestige and authority from the practical usefulness which these scientific principles were able to demonstrate. The predictive ability of science gave rise to the concept of determinism, which in turn led to the notion that the behavior of all material objects (which included human beings) could be projected if only enough data about them could be gathered. In other words, a human being was a mechanical system like any other, and if that system were sufficiently understood, its future behavior under all conditions and circumstances could be accurately predicted. Needless to say, such a view made the idea of human freedom a paradox, for freedom involves choice, and choice finds no place in the philosophy of strict determinism.

Although extrapolations from mechanics are to be found in almost every field of enquiry, from economics to psychology, their validity has rested primarily upon the evidence supplied by classical science. Therefore, acknowledgment of the essential non-materiality of fundamental particles, which was forced upon scientists through their studies of the electron, posed a series of new problems for philosophers, for it struck a mortal blow at the heart of classical mechanics. This situation obviously requires a wholly fresh approach, and this has been furnished by quantum mechanics, or quantum theory, which has now superseded classical mechanics in many important respects. The question we must now raise is whether quantum mechanics also serves as a valid basis for a philosophy of strict determinism, or whether it admits the possibility of human freedom.

In order to approach quantum theory, let us turn to the hydrogen atom. Signals received through rays shone upon a moving electron within the atom show that its path deviates in significant degrees from a classical orbit—its position being sometimes inside it, sometimes outside. The sequence of positions is most erratic, for a signal may come at random from any point near the orbit. If the sequence of locations is plotted, the resultant curve twists and contorts itself without rhyme or reason, as though endeavoring to meet the contingencies of the measurements. There is no simplicity of motion. Consequently, disposal of the problem of the electron's position becomes a matter not so much of scientific investigation as of philosophic scrutiny. As a result, scientists can only conclude that the important factor in our picture of the electron is not the individual points of location, but rather the totality of the distribution of these points. We are thus led to a statistical description of the electron's behavior.

There is another peculiarity exhibited in such an experiment. In analyzing the distribution, it is convenient to measure the distances from the center of the orbit along a horizontal axis, and to indicate the number of measurements at these distances on a vertical axis. When these points are connected on a graph, each point will represent the number of times that the electron has been found at a given distance from the center. If the classical orbit is taken as the norm, deviations either exterior or interior to this norm will occur—the number of these measurements being in all cases smaller than those near the norm. Thus the curve will assume a bell-shape, with the peak corresponding to the classical, or most probable, orbit, and will sweep downward on either side because of the comparatively rarer measurements of position inside or outside this orbit. This plot is called a probability curve.



In interpreting an experiment of this kind, we may say that if the electron had a precise position and if it followed the classical laws of motion — for instance, on the Bohr orbit— the bell-shaped curve which marked its path would have no width. The line of motion would show a steep and narrow peak. We can say, then, that certainty of position is associated with a curve of very small width. If the curve is broad, the measurements scatter and the statistical distribution or standard deviation is great. Now, study of the electron shows that the latter is a characteristic of its behavior. When its location is measured, the position points, as shown by the distribution, will scatter. The probability curve has a definite width, whose degree is, in scientific language, its measure of "uncertainty."

It is important to add that these uncertainties, this scattering of measurements, occur all through physics. They were not introduced for the first time by quantum mechanics; they were also present in classical mechanics, where, however, they were presumed to be due to errors of measurement. Extreme reliance upon mechanical techniques gave rise to the notion that improvement in instruments and increased precision in measurement would eliminate all uncertainty, and leave science, in this instance, with an elegant and clean curve of no width at all. But experiments which have led to acceptance of the modern theory of quantum mechanics have shown that this range of uncertainty cannot be eliminated, for it is inherent not in the fallibility of the observer's methods but in the very nature of the fundamental particles themselves.

This basic imprecision which is characteristic of the microstate has resulted in the formulation of what Heisenberg has called the Uncertainty Principle To illustrate, the following theorem is derivable from the axioms of quantum mechanics: The width, the scatter, the degree of uncertainty of the position-measurement curve (symbolized as Δ Q), when multiplied by the corresponding width of the velocity curve (Δ V) is, under all conditions, equal to, or greater than Planck's constant h divided by the mass of the system—in this case that of the electron. The important point here is that Planck's constant has a specific numerical value (6×10^{-27} in c.g.s. units), and since this is a finite number, the product of these two uncertainties, $\triangle$ Q and $\triangle$ V, must also be finite; there must always be *some* spread or scatter in measurements of position or velocity. If an attempt is made to reduce the position scattering almost to zero, so that we can predict, in the classical sense, where the electron *is,* almost exactly, then the other factor, velocity, will become proportionately large, so that it will be impossible to gauge the speed of the electron. For, as the product of Δ Q and Δ V must be a constant, greater precision about position can be achieved only at the price of greater uncertainty about velocity, and vice versa.

This, in essence, is the uncertainty principle as it applies to the electron. If one asks whether this relationship within the microstate holds so far as our experiences in the large-scale world are concerned, it must be said that it does not. Obviously the postion of a stone can be located with precision, and it can be propelled with any velocity desired. This does not mean, however, that the uncertainty principle has a special validity for the microstate only, and that it illustrates the exception rather than the rule so far as nature as a whole is concerned. The reason why it does not seem to apply in the case of the stone is that the mass involved is so large that the value of the constant becomes relatively so small as to be imperceptible, and therefore negligible. The uncertainty principle is always operative, for the laws of quantum mechanics do not admit of exceptions. But its predictions can tell us nothing new or startling about the behavior of stones, which classical mechanics had already made quite familiar to us. The world of elementary particles has proved to be beyond the reach of classical science, however, and it is here that quantum mechanics has given us the necessary clues to successful prediction.

Consideration of this principle of uncertainty leads directly into the problems of causality and determinism. As preface to this discussion, one of the more abstract concepts of modern physics should be mentioned. In our experience of the large-scale world, a single measurement may have predictive power. If we know the speed at which a stone leaves a catapult, we can assess accurately what its velocity will be at a future moment. But in the microcosmic world of the atom, a single event or measurement has often no predictive value whatever. It is only upon the basis of a large number of observations that a curve may be drawn which will indicate probabilities in the statistical aggregate of measurements, and so enable us to predict how the probability distribution may be modified in time. A single event is useless; prediction can only be based upon a large number of events. The situation in physics is here rather similar to that which prevails in sociology and in many of the areas of biological science. There, prediction is based on a large number of facts, not upon a single case or event. For example, an actuarial expert can predict the number of deaths which will occur in a given society during a given period of time. He can even forecast the incidence among males and females or among the young and the old. But of course it is quite impossible to select the individuals who are going to die.

This is a point of great significance to the problem of causality. Upon knowledge of many past

events the scientist can today predict the distribution of aggregate-events in the future. But with single events or facts he can do nothing.

The dependence of prediction upon this kind of statistical distribution, whether it be of people or of particles, can be illustrated by a rather low-level story. It happened that a couple of Yale students had been to a party on the outskirts of New Haven, and had there imbibed rather too freely. As they were weaving a somewhat erratic course homewards, one said to the other, "Well, good, at last we're coming into New Haven." The second protested that he didn't believe it, and that even if it were so they were much too fuddled to know it. "Oh yes, we are," said the first, "I know it because we are hitting more people." Even in his bemused state, this student was scientist enough to be aware that the significant fact was not that he might or might not run into a particular friend, but that he did bump into a certain number of people in a certain period of time. This, in a primitive sense, illustrates the nature of quantum mechanical predictions.

The fact that we can speak about probability distributions, but can make no predictions about individuals, is of importance in considering the question of causality within the frame of contemporary science. In this light, what is the meaning of cause and effect? These terms are used so loosely that everyone seems to have his own ideas as to their meaning. In cases where there is such uncertainty, we like to think that science can contribute an exact meaning, but unfortunately as regards cause and effect we find that scientists use the terms as indiscriminately as everyone else. If we are to get anywhere in our discussion, we shall have to make our own analysis.

IN what ways, then, are these terms cause and effect generally used? In philosophy, we are accustomed to such statements as "the cause of the oak lies in the acorn." What does this mean? Since both acorn and oak are material things, causality in this instance is regarded as a relation between actual, perceptible, material objects. But suppose we take another much-used example: "Alcohol is the cause of an accident." Legally, such a statement may be perfectly correct, but what does it mean, when analyzed? Alcohol is a material substance, but an accident is an event. Therefore, in this case causality exists as a relation between two dissimilar entities or orders of being: a thing, and an event. Still another kind of relationship is involved in a third statement: "Over-production is the cause of a depression." No things or objects at all are included in this case; both cause and effect are represented by events or processes.

One final class of statement should also be considered: "A collision is caused by a convergence of bodies in motion." If two cars are moving at right angles to one another, their distances and speeds as they approach an intersection will determine whether they collide. In this case, although material objects are involved, we are actually speaking entirely in terms of events.

The whole history of man's concern with causality illustrates just such a concrescence of meaning upon causes and effects as events. To Aristotle, it appeared that the meaning of the term "cause" must always be indefinite and ambiguous, since to him it referred to material things as well as to events. From this point of view, it is impossible to discover a complete cause; we can only speak imperfectly of partial causes. The acorn may be the cause of the oak, but it is certainly not the only one; sunshine and rain, the cycle of seasonal growth, and the whole ecology of the earth are contributory causes.

It is only when we begin to think of cause and effect as *events* or, still better, simultaneous sets of events, that we are able to remove some of the limitations which restrict us to a partial view of causality. Today, modern science has come to the point where it treats causes and effects as the specificable *states* of a physical system, a state being a sufficient collection of events all at a given time. Thus, for instance, if we are interested in the causes of a collision between two bodies, we see that what we call "collision" is simply the state of motion of a combined system in terms of the positions and the velocities of the two objects involved. This presents us with a scheme for causality: The cause is always the state S of some object or physical system at the time t, while the effect is the state S' at some later time t'. Moreover, we can normally predict the state S', for the motion within the system is governed by those same laws of nature which Newton enunciated.

In fact, the simplest and most easily appreciated instance of causual relationship is provided by classical mechanics. Here the state of a mass-particle is fully specified by its position, q, and its velocity, v. Given these two factors, and taking into consideration the forces which are acting upon the mass-particle, application of Newton's laws of motion enables us to predict its future state with accuracy. Thus its present and future conditions are causally related.

In sum, if two states can be defined in the same terms, and if a law of nature connects them in such a way that one can be predicted from the other, then the two states may be said to be related causally. The state which is temporally prior is called the "cause" of the later state, and the latter the "effect" of the former. In the human body, sickness is a state which significantly precedes another state called natural death. Causality, in this case, depends upon events within the physical system called the body. This state of affairs, thus exemplified biologically, obtains in

every field of science today. Physical systems are described definitively, and the laws of nature which operate upon them are developed into equations which permit the prediction of later from former states. All of theoretical physics, chemistry and mathematics, all of those portions of biology, sociology and economics which might be called exact, can be understood in terms of such a causal schema. In fact, one might say that the predictive power of science is founded primarily upon this concept of causality.

The important question for man, however, is whether the principle of causality can be extended to apply to human relations. Is it permissible to regard human beings as physical systems of the kind described above, wherein future states may be predicted because present states can be completely specified?

IN the days when Laplace uttered his famous dictum, it will be remembered, the whole universe was thought to consist only and entirely of mass-particles. Upon the evidence of Newtonian mechanics, the inference was made that causal relations operated universally, and thus that every system, every organism, every living creature was as surely bound by deterministic forces as were the motion of the planets or the growth of a crystal. The doctrine of determinism, so extended, was based upon the assertion of Laplace, made in 1880, that "An intelligence knowing, at a given time, all forces acting in nature, as well as the momentary positions of all things, would be able to comprehend the motions of the largest bodies and those of the smallest atoms in one single formula, provided it was sufficiently powerful to subject all data to analysis."

In the heyday of classical mechanics, no one had any cause to question the inevitability of this kind of straight-line determinism, which reduced man and beast to the level of interacting mass-particles. But if the 20th century has taught us anything, it is to doubt that problems have final solutions, or that causes of the type just mentioned have final effects. If this is true in physics and chemistry, how much more is it so in the field of human relations, where we have achieved nothing like the same degree of theoretical precision. Even the data with respect to human actions are incomplete and contradictory. Since the situation is so complex, one can only make statistical and uncertain assumptions with regard to human beings, and it is as legitimate to suppose that determinism does not hold for man as it is to suppose that it does. But a still better method would be to reexamine the evidence which physics offers for strict determinism. Since this principle was first established through reference to the laws of physics, it seems proper that an evolving physical theory should contribute with some weight to this discussion. For surely if determinism cannot be defended adequately in physics it is unlikely that it can be defended anywhere.

Now even within the limitations of classical mechanism, there has always been the spectre of what one might call a-causality — of phenomena that refused to comply with a strict and undeviating determinism. None has ever been certified, but their possibility was never definitely excluded. This might be illustrated by a somewhat apocryphal tale.

Once upon a time there was a physics professor who was tremendously interested in clocks. He had one particular clock in his laboratory which he dearly loved, and which he hoped to make as perfect, as correct, as it is possible for a clock to be. But in spite of his best efforts, the clock was still slightly erratic. Convinced that the fault could not lie in the clock itself, which he conceived to be mechanically perfect, he first thought that its deviations must be due to changes in temperature. So he arranged to house it in an elaborate cabinet which would always maintain a constant temperature. But the clock was still erratic, and he was forced to look elsewhere for the cause. Next he discovered that in the room below there was a kind of atom-smashing machine which contained a huge magnet that was sometimes energized, sometimes not. Feeling sure that he had finally discovered the reason for the clock's mischievous behavior, he took it far away to a tower room, remote from all possible perturbations. And now, he thought, it will surely run with complete accuracy. So he was almost at his wits' end when the trouble persisted. But then he discovered that the janitor of the building was also interested in clocks, and had been giving this particular mechanism the benefit of some dubious attention. The scientist felt that in this discovery he had tracked down the final unknown and had removed the last threat to his clock's precision. There remained, in fact, absolutely no reason why that clock should not have behaved perfectly. Nothing in the universe was affecting it adversely— neither the passage of meteors, nor seismic disturbances, nor solar eruptions. Yet the clock continued to run erratically. There was no law of nature by means of which its future behavior could be predicted. The scientist was reluctantly forced to conclude that it was an a-causal clock; it was an indeterministic device.

It may be admitted that this would be a very exceptional case in Newtonian mechanics, which is perhaps fortunate for man's sanity. For this reason classical science felt it could safely ignore such random freakishness, since on the whole physical phenomena submitted quite docilely to its strictures. But when quantum mechanics arose, the situation reversed itself, for here the inde-

pendent behavior of individuals proved to be the rule rather than the exception.

As we have seen, in quantum mechanics it is not possible to predict on the basis of single events. It is necessary to have a large number of occurrences, and predict the probability. Single events involving particular individuals are not and cannot be determined by specific past events. Since causality is a relation between individually specified states, it is apparent that it does not operate in the microcosm, and therefore that determinism is not a universal and invariable principle.

THIS qualification may seem at first glance to be rather trivial and unimportant, but it has significant bearing upon the basic meaning of determinism and upon its extensions and implications. For the effects of individual unpredictability are not confined to the atomic level. Suppose, for one example, that there were a super-critical block of fissionable material in an exposed position—even though this is scarcely probable. Such a mass is all ready to be triggered into an explosion if a neutron hits it. Now there are always neutrons about, but let us suppose again that just one neutron is in the vicinity of this vulnerable material, and moving toward it. According to the precepts of Laplace and classical determinism, according to all the measurement we can make, nothing could prevent this neutron from hitting the material and causing an explosion which could wipe us all out. But fortunately our story may yet have a happy ending, for according to the unpredictability of quantum mechanics, this dangerous neutron may "change" its supposed course in mid-flight and miss the fissionable mass entirely.

Fanciful as this example may seem, it nevertheless demonstrates that complete certainty, complete predictability no longer hold unvaryingly "true." Strict determinism still applies for aggregates, but the individual, whether he be a wandering neutron or a human non-conformist, may possibly retain his personal unpredictability. Thus, migrating birds can be counted upon to fly north in spring, but can we say which of the flock of robins wheeling across the March sky will choose to nest in my garden? Stars in our Milky Way pursue the same slow patterns of birth, growth, senescence and death as do those in the remotest galaxies, but who can tell which one may have a following planet capable of sustaining life? As for man, the statistical averages of population increase can predict how many human beings will inhabit our earth in another ten or twenty or fifty years, but they cannot tell us when or where a man of genius or creative insight will be born. We know much about the behavior of masses and aggregates, but the individual still eludes us, hiding his uniqueness behind conformity to his species, his genus, his kind. In science, he is still a "singularity."

But although determinism can no longer be considered a valid doctrine, does this mean that the principle of freedom has been proved? Many people have thought so, and they have not hesitated to apply the uncertainty principle widely to other fields, notably biology. Evidence from quantum mechanics has been hopefully called upon to substantiate the idea of human freedom. This issue is of immediate importance at a time when the whole concept of freedom has been so much under attack. Therefore it is worth considering two particular theories which were advanced by Pascual Jordan, one of the originators of quantum theory, who believed that the axioms of quantum mechanics did indeed apply to and demonstrate the freedom of biological systems.

Jordan first proposed the single-hit theory of mutations. He argued that living organisms frequently suffer a fate which is determined by the mutations of their genes, those entities which determine inherited characteristics. Mutations or alterations of genes are of great consequence to the organism, and although they may occasionally be fortunate, they are much more often destructive. Experiment has shown that mutations occur when the genes are struck centrally by atomic particles such as electrons or gamma rays. Jordan's conjecture was that this established biological fact proves that the occurrence of mutations is tied to the uncertainty principle. Whether a particular gene will actually be mutated by a particular atomic missile is, according to quantum mechanics, necessarily unpredictable. Therefore since our fate depends upon this event, we may be said to be free, for the event itself is no longer tied directly to mechanistic laws.

Jordan's second hypothesis is known as the amplifier theory of life. An amplifier is an instrument that magnifies small signals, such as a radio or the Geiger counter, which is simply a tube wherein a very small signal sets off an electrical discharge. An electron which is shot into a Geiger counter is of course much too small to be seen, but it sets up a discharge which activates a relay or counter, and this produces a signal of macroscopic proportions. It can, in fact, be magnified to size desired. In this way, an amplifier has the power to project the lawlessness of an atomic event into ordinary life, by enlarging it to the magnitude of daily experience. Since the atomic event is unpredictable and can be known only on the basis of aggregates, no prediction can be made of the larger impulse which it has set up.

Jordan proposed that a living organism, such as the human body, is just such an amplifier. There is some justification for this belief, for sensory organs like the ear and the eye are able

to translate very small energy pulses into perceptible phenomena. The uncertainty of the atomic level might therefore be projected into the macroscopic world through the amplifying action of our senses. Jordan's thesis was that in this way the uncertainty of the microstate extends into human life, since sensory experience plays such an important part in determining our action.

BUT do such theories really establish the concept of freedom on a sound basis? Can we even say that man is free if his responses and his acts are the result of unpredictable impulses? Surely freedom, as we apply the term to human beings, implies self-determination, which in turn relies upon consciously controlled choices. If quantum mechanics alone were the guide of action, all man's achievements would be merely the random effects of un-caused atomic impulses. The pattern of human activity could be predicted in general, but no noble or creative or saintly endeavor could be expected of anyone. Under such circumstances it would indeed have been far more likely for the 100,000 monkeys to produce Hamlet than for Shakespeare to have done so. Furthermore, far from being free, each one of us would be caught in a web of uncertainty, unable to make a choice or a useful decision, since we would have no control over individual action. There could be no goals or goal-seeking, no planning and no purpose. Life would be a thoroughly hit-and-miss affair.

This criticism affects both of Jordan's theories. For after all, genes do not choose to mutate; they simply react to un-caused atomic events.

All of this shows that it is not yet possible to prove the reality of human freedom on the basis of evidence from the material sciences. What quantum mechanics has proved, however, is that strict determinism, which precluded even the possibility of freedom, is a fallacy. Science may not be able to say that freedom exists; it can say that determinism does not.

The gap in our knowledge has yet to be bridged. But the troublesome paradox which so disturbed us has been removed. We are no longer faced with the impossibility of reconciling our intuitive conviction of human freedom with the testimony of classical mechanics. Formerly we had no means of defending our nebulous but still powerful belief in freedom other than reliance upon faith and religious experience. But today physics, having left the firm but narrow ground of materialistic determinism, has joined philosophy in exploring the wider reaches of the non-material.

This problem is far from solution. But at least its roots, which lie deep in the physical basis of life, are no longer blighted by a sterile determinism. One great obstacle to understanding has thereby been removed.

The foregoing article is based upon lecture in a series entitled "Philosophical Perspectives of Modern Physics," given by Professor Margenau at The New School in 1956-57, co-sponsored by the Foundation for Integrated Education. It forms one of the chapters in a book of the same general title, now in preparation.

SOME NOTES ON THE BURMESE LANGUAGE

Carter Zeleznik

DR. Khim Maung Win has recently published a very intersting article concerning "The Psychology of the Burmese Language" (MAIN CURRENTS in Modern Thought, May 1960, Vol. 16, No. 5, pp. 110-114), in which he subjects this language to philosophical analysis. There is some difference between what would be implied by a "psychology" and a "philosophical analysis" of a language. In fact, the reification of a language so that it can be given either a psychology or a philosophical analysis is somewhat startling. Presumably we are to understand that it is not the language as such which is being studied but how the language expresses the psychology of Burmese people (note that we do not reify "*the* Burmese people" either) and therefore permits us to make a philosophical analysis of them. The conceptual proximity therefore of the study of a psychology and of a philosophy ought to be of great importance to us; if our conceptual models are properly arranged we should be able to make a number of interesting and useful logical transformations between philosophical expressions and psychological expressions in a given cultural area.

Dr. Win, wisely, we believe, phrases his inquiry in terms of Northrop's conceptual distinction between concepts by postulation and concepts by intuition (i.e., concepts by inspection). The conclusion which he draws from his study of the Burmese language is that "all concepts in the Burmese language are concepts by intuition. There are no concepts by postulation in it." Understanding concepts by postulation to refer only to the formal constructs of ancient Greek and modern Western mathematical physics and of Stoic Roman and modern contractual law (as suggested by Northrop), it is easy to understand how this conclusion could be reached. However, there is a danger in supposing that the Greeks, Romans, and modern Western physicists and legal theoreticians have a monopoly on the use of concepts by postulation. There is a danger in a purely historical approach to analytical problems.

The present writer knows virtually nothing of the Burmese language apart from what is suggested in Dr. Win's paper. However, as Dr. Win would no doubt agree, he does not exhaust the subject in his paper and other facets may be examined. For example, the present writer has just completed the preparation of some number charts in the Burmese script. These number charts correspond exactly to the number charts used by the ancient Greeks and Romans and again by Western physicists, and presumably, also by Western legal theoreticians. In fact, it is believed that the particular number charts in question will be a revelation of some sort to the Burmese because on these charts it is possible to perform calculations of seemingly amazing complexity with a maximum of ease. It is believed that the Burmese will say (in Burmese, of course), "This is amazing. It had not appeared that it was possible to do these things with our numbers." Some sophisticated Burmese might feel that although it had not been done, if it could be done, why not with Burmese characters?

The question then is whether to include or to exclude the number system and the mathematics of a culture when discussing its formal language. There is no a priori reason to exclude the numbers. Insofar as they are included, it becomes increasingly difficult to assert that the language is devoid of concepts by postulation. A number concept, insofar as it is a number concept (insofar as the symbol refers to "twoness" rather than to two things, thus requiring a different symbol for each two things), implies a concept by postulation. To be sure, many or most Burmese (like many or most individuals in Western culture) have no notion of numbers which are not real whole numbers. There is no understanding of irrationals, negatives, etc. But we cannot say that because the number system is incomplete the numbers are not concepts by postulation. After all, nobody ever sensed "twoness." "Twoness" is not a concept by inspection no matter how we look at it. And, of course, the Greeks and Romans never recognized numbers or irrational numbers either, while the Burmese are able to work with a zero concept which is more sophisticated in terms of the number system than what the ancients had.

There is little question that within the restrictions of their applications, Burmese numbers work in exactly the same way as do the numbers in the Western world. These, at least, point towards concepts by postulation in the Burmese language and that they do suggests that the Burmese are also capable of understanding concepts by postulation in other areas *regardless of whether or not they do now understand them as such.* To say then

"that the Burmese people live temporally in immediately experienced present events" is an incomplete description of how they live. Relatively speaking it may be descriptively correct, but we must distinguish those expressions of life which include a number concept from the rest so that the statement can only apply to the latter, at least in any unlimited sense.

Yet, we think, there is more. The specific content of the Burmese verbal expressions is likely to be very much radical empiricist, very much concerned with that which is fleeting and seemingly transient, and almost purely concept by inspection. Yet the language relations are somewhat different. Individual actions may be thought of as absolutely unique. "Going downtown" expressed with regard downtown" at any other time. No two chickens are exactly alike, and no two "bigs" or "littles" are exactly alike. However, in the phrase, "after go downtown, buy chicken," the word "after" is of crucial importance. "After" refers to nothing which can be seen, heard, tasted, felt, or otherwise seen. It is a purely relational concept and relations by definition are logical constructs and are therefore concepts by postulation. How else would the difference between "before" and "after" be known if the relation were not a postulated relation? Neither "before" nor "after" have any temporal significance in and of themselves, although they may be applied to the temporal aspects of the radical empiricist's world, if it is meaningful for a true radical empiricist to have a temporal orientation apart from certain specific events.

Although Dr. Win states that space is as relative to the particular occasion for the Burmese as time is, there is little doubt that if we were to look at the equivalents of our prepositional forms (on, in, over, below, above, through) which are related to our spatial concepts, we would find again concepts by postulation. In fact, wherever relationships are asserted, we would fiind such concepts by postulation, because as we have noted, all relations are logical concepts and all logical concepts are concepts by postulation.

When Dr. Win then states that the Buddhist (presumably the Burmese Buddhist) is a radical empiricist who only uses concepts by intuition, we are confronted with an interesting inconsistency. It is the content of the concepts which is radical empiricist, but their structure appears to be formal in terms of concepts by postulation (although this would be denied in the content of the expressions). These concepts by postulation, however, have not been formulated explicitly in terms of a deductive theory, but it is only in terms of a deductive theory that they can be understood. Implicit within the Burmese language then, as we believe implicit in every language, there is a deductive theory. That is, any concept by inspection implies a concept by postulation in order for it to have meaning.

Anthropological research then can be exceedingly valuable applied to the analysis of language, not, however for the purpose of demonstrating "black" and "white" in the empirical world, but to show us inconsistencies in the ways in which we use concepts. Dr. Win has shown us not that the Burmese are or are not radical empiricists, but that even though they try to be, they are not successful and cannot be successful, if in fact they do have a language form to express their ideas.

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A Theory for ESP

SUCH phenomena as those of memory, and indeed of perception itself, are indisputable facts of experience. Attempts to explain them in terms of the known laws of physics have been singularly unsuccessful, although no physical scientist can reject or deny the facts of his own first-person experience. There is some good evidence for ESP (especially as regards telepathy) which is rejected or ignored by many scientists, because it is quite incompatible with current physical theory. ESP represents the transmission of information between two points (which may be separated by miles in space or days in time) without the intervention of a physical signal. In physical terms, we may consider the information, before such transmission, as consisting of a particular pattern of neural activity in a human brain. Such telepathic transmission, then, would consist of the reproduction in one brain of a pattern analogous to that in another brain. Can such phenomena as perception, memory, and even ESP, be subsumed under any theory not incompatible with current physics?

The British Journal for the Philosophy of Science (Vol. X, No. 40; Feb. 1960), presents a paper by Ninian Marshall in which a holistic Theory of Resonance is carefully structured and developed, and then applied to such problems in psychology as those indicated in the above paragraph. The paper is entitled: "ESP and Memory: A Physical Theory." Space limitations unfortunately prevent the inclusion here of the major portion of the author's arguments and developments, but some of the more pertinent comments may be given. In his Introduction the author points out that:

"The difficulty of fitting ESP into quantum physics is reminiscent of the difficulty at the turn of the century of fitting the facts of blackbody radiation into classical physics. In both situations, the reigning theory is supported by vast numbers of accurate experiments, but cannot begin to explain the results of other newer experiments. The solution then was to form a theory which under classical conditions predicted classical results but under conditions involving few quanta predicted the new results. This presupposed that parameters were involved in the new laws whose values differed widely in the two sorts of experimental condition. In effect two domains were distinguished, each with its own peculiar phenomena.

"I believe that a similar maneuver can integrate ESP phenomena into current physics. The main difference between the conditions under which classical and ESP phenomena occur is one of complexity. All controlled physical experiments are performed on structures simplified as much as possible; whereas ESP phenomena have been found only in the human brain, the most complicated structure in the universe. Hence, predictions in the usual domain of physics will be left almost unchanged if any law is added of the form: 'Effect X is found in structures. The size of X is proportional to the complexity of the structure.' . . . Any theory of this form will be a holistic theory, and will result in the distinction of a highly structured and a simple domain."

Considering telepathy as the partial reproduction in one brain of a pattern in another brain, Marshall develops the Hypothesis of Resonance: "Any two structures exert an influence on each other which tends to make them become more alike. The strength of this influence increases with the product of their complexities, and decreases with the difference between their patterns." This hypothesis has a formal resemblance to Newton's Law of Gravitation. The second hypothesis, formally analogous to Newton's Law of Force, Marshall calls the Hypothesis of Eidopoic Influence. (Greek: *eidopoios*: creating a form or pattern). This hypothesis states: "The change of pattern produced by an eidopoic influence increases with its strength, and with the quantum mechanically defined probability of the change." The author observes: "These two hypotheses constitute the preliminary statement of the theory. They predict significant deviations from current physics only under two conditions: (i) Complex structures must be involved. (ii) These structures must have 'indeterminate' features in their observable behavior . . . these two conditions, complexity and indeterminancy, have so far been satisfied only in the brain. But a physical apparatus could also be built which would satisfy them both, and provide a controlled test of the theory."

The theory here presented is holistic and physical. For a physical theory is a falsifiable set of predictions about the behavior of atoms, photons, and the like. And a holistic theory is one which implies that the behavior of a whole cannot be calculated accurately from the laws observed to govern the behavior of the separated parts. The present theory is therefore much more holistic than current quantum physics, in which few 'emergent wholes' appear. There have been equally holistic theories in philosophy, religion, biology, and psychology; but not in physics. This is a gap, as a holist of any other sort needs also to be a physical holist, or lapse into radical dualism or inconsistency.

"One may intuitively dislike the present theory," continues Marshall, "because of its novel

features. It postulates action at a distance in space and time, and co-ordinated action at many points in a structure. It postulates that some, at least, of the 'indeterminancies' in quantum physics are in fact determined in a holistic way. All this may go against the grain. Physicists had similar feelings when quantum theory was introduced; many still dislike its wave-particle duality. The main virtue there, as here, was not the attractiveness of the model (or lack of a model), but the unity and explanatory power of the theory."

Marshall accepts the existence of telepathy as unquestionable, and cites as one instance the Soal investigations on Basil Shackleton, whose total score gave odds against the chance hypothesis exceeding 10^{35} to one; but who got especially high results with only three out of eleven agents who were tried. He makes some broad generalizations concerning telepathy, all of which seem to be consonant with his "theory of resonance." Telepathy is usually a fairly erratic process; it is usually unconscious; the information may undergo distortion before reaching consciousness; it is not under voluntary control and is highly labile; only a few subject-agent pairs have produced consistently high scores. But telepathy can occur over a distance of (at least) 200 miles, and over a time-interval of a day or two in either direction. The ideal conditions will be when one brain is in strong resonance with one other brain, and in weak resonance with all the structures.

Marshall points out that it is not only in telepathy that there are difficulties in abstracting the telepathic information from the complex pattern of brain function in which it is embedded, for these difficulties also occur in perceptual processes. As he remarks: "A non-musical adult listening to a symphony cannot separate the sounds of the different instruments, nor recognize the themes when they recur in an altered form. Quite possibly ESP ability requires this kind of skill in unemotional situations such as the usual planned experiment. . . .

"Physical experiments are performed on simplified structures. There may be undiscovered holistic laws whose effects would be strong only in complex structures like the brain. Such a law is proposed, the 'law of resonance,' to explain the existence of telepathy and memory. By this law, any two similar structures exert an influence on each other which tends to make them become more similar. This influence can act on physical structures only within the limits of the indeterminancy principle, but is independent of their spatio-temporal separation. Resonance of a pattern of neural activity in a brain with another brain leads to telepathy; resonance with a past state of itself leads to memory. This theory fits the relevant facts in physics, neurophysiology, and psychology."

—Alan Mannion

How Scientists See God

AN exploratory study of the concepts of God reported by selected samples of physical scientists, biologists, psycholosists, and sociologists has been made by the undersigned, through the resources of the Lyon Mental Hygiene Clinic. The study is available from either the library of the University of Southern California or University Microfilm, 313 N. First St., Ann Arbor, Michigan.

The work is derived from earlier investigations made by the late James Leuba, a psychologist, in which he asked selected groups of physical scientists, biologists, psychologists, and sociologists whether they believed in, did not believe in, or had no definite belief with respect to a stated concept of God, in this case a God to whom the scientist might pray in the expectation of receiving an answer. Leuba means for the word "answer" to include more than the natural, subjective, psychological effects of prayer.

With respect to the current study, questionnaires were sent to 707 appropriately selected scientists. Of those who received them, 297, or approximately 42 percent, returned usable questionnaires. The obtained samples numbered 90 physical scientists, 70 biologists, 81 psychologists, and 56 sociologists.

The questionnaire is divided into four parts. The first part consists of items of identifying information, while the second asked the scientists to indicate the source of their concepts of God, as well as the most important single source of those concepts. The third part of the questionnaire is composed of twenty-five carefully selected concepts of God, divided into three categories of religious philosophy, namely, naturalistic humanism, religious liberalism, and traditional orthodoxy. The scientists were asked to indicate those concepts which they felt were a part of their concepts of God by checking all twenty-five concepts either "yes," "no," or "no opinion." The fourth part of the questionnaire permitted the scientists, if they wished, to submit their own personal statements of their concepts of God.

Within the limitations of this study, it appears that the most important sources of scientists' concepts of God are parents, personal religious experience or practice, present or past sceintific endeavor, and formal education. The concepts of God of psychologists are based on a smaller number of concepts, and these are more "nonreligious" than is true for the other three groups whose concepts are based on a larger number of sources which are more "religious" in character. There is a low positive correlation between the ages of physical scientists and psychologists and their responses to the religious liberalism scale of God concepts.

With reference to both the 25 categories used in this study and Leuba's study of 1933 involving

a single concept, it would appear that the concepts of God held by physical scientists and biologists are more orthodox than those of psychologists and sociologists. The written statements of scientists which give their personal concepts of God show that 63 of the 81 statements submitted are of either a religious liberal or traditional orthodox character while 18 of the 81 statements are of a naturalistic humanistic concept of God.

Comments are made on the empirical findings of the study as seen in the light of the changing emphases of science which have taken place over the last thirty years, while the concluding summary statement points up the psychological and religious value of the present study.

—M. David Riggs

China: Yesterday and Today

ONE of the great handicaps which the Western democracies suffer in their relationship with the Communist world derives from a lack of understanding of its basic ethos. It is this which has made it so difficult for the West to seize the initiative, for this ability is dependent in turn upon the ability to know another's mind sufficiently to be able to understand his actions in appropriate situations. If this applies to our relationship to Russia, it is infinitely more the case as regards Communist China, where our lack of communication with the mainland, plus a general ignorance of Chinese social history, plus the contradictory emphasis of Nationalist China, have combined to keep us in almost perfect ignorance of what really constitutes the revolutionary character of modern China.

For these and many other reasons, the two-part article entitled "The Past in China's Present," which Joseph Needham contributed to the Spring and Summer 1960 issues of *The Centennial Review of Arts and Sciences,* deserves extended notice. Dr. Needham is not primarily a student of contemporary affairs, but his monumental work, *Science and Civilization in China,* which when completed will undoubtedly be the definitive study for the West, has led him deeply into the origins and development of that culture, so that he is able to perceive its current changes against the background of many centuries. This is the only way they can be properly understood and appreciated by peoples of other cultures.

Needham begins the first section of the article, a discussion of a cultural, social and philosophical background for contemporary China, with a survey of China's social structure. For at least two millenia a bureaucratic-feudal system gave the Chinese culture a continuity enjoyed only partly by Israel among the other nations of the world. This form of feudalism, unlike the aristocratic military Western variety, was based upon a non-hereditary civil service, recruited from the "scholar-gentry," which could only in a sense be called a class, since it had a great deal of fluidity. These scholar-bureaucrats, who won their position through competitive examination, were the literary and managerial elite of the nation. This basic conception of a non-hereditary elite in a non-competitive society has much in common with the present-day conception of membership in an organization like the Communist party, wherein prestige and leadership are dissociated from birth and wealth. This non-hereditary civil service tradition in ancient China was so successful that it inhibited the rise of the merchants to power and, most significantly, creamed off the best brains from all levels of society. This last function alone helps to explain why the feudal system could have given way to capitalism in the West, while the bureaucratic feudalism of China continued to flourish. It is necessary to realize that, for the Chinese, capitalism was something essentially and intrinsically foreign, imposed upon them for a few short centuries by Westerners enjoying a military strength based on their fortuitous development of modern technology.

Other characteristic aspects of modern China reflect what are in essence century-old traditions. The organic unity of rulers and people is one; when Mao Tse-Tung and the members of the Central Committee spend a day with the workers shovelling earth at a new dam, they are offering the modern equivalent of an ancient rite. The deep respect Chinese people feel for authority is based upon the idea that a government is not simply created by the power of one man, but is part of a certain cosmic order in which all are involved. Another important feature of the social background of present-day China is what historians call the hydraulic tradition. In ancient times engineering was of overwhelming importance; the emphasis upon great public works reflects this today. Moreover, the idea of nationalized production, believed by some to be a recent development, goes back at least to the 4th century concept of the Old Silk Road. The idea of State control is thus, for the Chinese, a natural development arising out of their own history, unlike Western peoples who have been permeated by conceptions of individual capitalist industrial enterprise. In fact, there has traditionally been a low regard for merchants, as well as for soldiers. The ruin of Kuomintang China was quite naturally attributed to the nefarious activities of the banker-comprador-merchant group.

According to the ancient classification of the estates of society (scholars, farmers, artisans, and last, merchants), farmers occupied the second place, for farming has always been recognized as fundamentally important. The Communist Party therefore derived a great deal of moral force because it came from the country. At the same time,

there has been in China a classical admiration for the dignity of manual work. This may be due to recognition of the fact that all cultures suffer from the divorce of *theoria* and *praxis,* and that it is only when the manual and the intellectual are combined in one individual's experience that mankind can reach its highest stature. The mystique of manual work which has grown up in China is not only an expression of mass feeling; it is inevitable if the Chinese are to coalesce into a single, unified and, as far as possible, classless society.

Another important element in the sociological structure of China is the tradition of social cohesion. Although the institution of the large family has been dying out, the social characteristic of forebearance which it engendered still shows itself in attitudes of cooperation and enthusiasm for public work among all types of workers. There appears to be little of the kind of compulsion which the West supposes to prevail; instead a new type of social engineering, the product of leadership from within, raises up movements as urgent popular demands. The many examples of individualism among Chinese scholars, upon which Western sinologists have delighted to expatiate, have given some distortion to our conception of the Chinese people, and have to some extent blinded us to the more essential and deep-rooted cohesive factors in Chinese society, of which modern cooperatives and communes are the most recent extensions.

As for democratic tendencies, Needham has this to say: "Most Europeans who have lived in China will agree that although the celebrated Greek origins were no part of the Chinese inheritance, there is a vein of instinctive democracy running very deeply through the culture. The almost complete absence of special 'built-in' forms of linguistic address between superiors and inferiors . . ., the age-old recognition of intellectual capacity absolutely irrespective of birth, the profound humanism of Confucian ethics, and the classical acknowledgment of the human dignity of the farmer and the artisan, all illumine a living experience of contacts with and among Chinese people." There is no doubt that the Chinese have adopted whole-heartedly a particular political philosophy, which exerts a great deal of social influence on individuals, but there is much latitude in interpretation. Visiting China in 1958, Needham saw everywhere the watchword *"Kan hsiang, kan shuo, kan tso!"* — which means, "Dare to think, dare to speak, dare to act." This hardly seems consonant with a dictatorial authoritarianism.

In the second section of his paper, Needham discusses the philosophical aspects of China's history — its background of Confucianism and Taoism. The Confucian ideal was a state of social justice insofar as this could be conceived within the framework of feudalism. The basic idea that every person exists in a kind of concrete special functional relationship with every other person in society is one which is capable of perpetual renovation, and therefore equally applicable to modern situations. The emphasis now, as always, is on duties rather than on rights. Taoism is equally a present influence (Buddhism, in Needham's view, a lesser one); thus the Taoist ideal of renunciation, whereby the individual is led to develop non-attachment to the fruits of labor and the rewards of the material world, lends an aura of puritanism to present social attitudes.

Turning from the ethical to the metaphysical, Needham draws attention in particular to the creators of the great scholastic synthesis of the 11th and 12th centuries. He says, "What may have been an important factor in the rallying of the Chinese intellectuals to the communist point of view is the fact that Neo-Confucianism was closely related to dialectical materialism. In other words, this system of thought, which was really the culmination of Chinese philosophical speculation throughout the ages, was a materialism, but it was not a mechanical materialism. It was, in fact, an organic conception of Nature, a theory of integrative levels, an organic naturalism, having nothing to do with an external transcendent creator-deity or supernatural being of any sort, but at the same time leaving all possible room for man's highest experiences, highest indeed of the successive levels of organization and integration in the world of Nature. It was thus essentially not dualistic. It was, if you like, holist. It was therefore closely allied to the conception of dialectical materialism, which is also a materialism but not a mechanical one, and pictures a dialectic in Nature such that contradictions are constructively resolved at a series of integrative levels (plant, animal, social, etc.); the series of the *scala naturae,* in fact, with all the transitions between its stages.

"The Neo-Confucian school operated with two fundamental conceptions, *chhi* and *li. Chhi* originally meant something rather like the Greek *pneuma,* a vapor . . . but by the Sung it had come to mean all matter, the grossest as well as the most tenuous. . . . As for *li,* the word began by meaning a way of cutting jade according to its natural pattern, and eventually came to mean essentially all structure in Nature itself—'natural organic pattern.' These words are absolutely not translatable by Aristotelian matter and form; they have at first sight some similarity with those concepts, but at bottom they are not at all similar. . . . Among the most profound of Neo-Confucian ideas is that embodied in the famous phrase *wu chi erh thai chi,* 'that which has no Pole and yet itself is the supreme Pole,' namely, the conception of the whole universe as an organic unity, in fact, as a single organism. . . .

"It is important to notice how deeply opposed is this non-dualistic, organic conception of the universe to what I intend in due course to call, adopting a phrase from Lancelot L. Whyte, the 'European dissociation.' By this I mean that confused dance in which Europeans have engaged from the earliest times, oscillating between theological spiritualism on the one hand and mechanical materialism on the other. . . . All the outstanding thinkers of Europe have been torn between the two poles. . . . Nothing of this kind existed in Chinese culture. . . . This does not imply that there were no basic psychological conflicts in Chinese civilization, . . . but rather that conflicts within Western man were unduly heightened and intensified by a fundamentally unreconciled dualism, an unsolved contradiction, lying at the root of European culture itself. This is why it has so much yet to learn from China—and from India.

"In any case, it is easy to see that the profound unitariness of Chinese culture not only favored the acceptance of dialectical materialism as its own *philosophia perennis* in fully developed form, but was also very congruent with the conception of the one-party state. Traditional China has never been anything else. . . .

"There is an obverse, of course, to all this and that is the absence of certain trends in China. Most conspicuous by its absence was any strong tradition of metaphysical idealism. . . . Buddhist thinkers must not be forgotten, . . . but whatever they did affected the general trend of Chinese thought, I submit, remarkably little. . . . There never appeared in China a powerful theological philosophy. . . . Marcel Granet had indeed been right when he spoke about the Chinese conception of the universe as an order which positively excludes the notion of law. Leibniz's idea of a pre-established harmony was one of the most Chinese formulations which ever found itself incorporated in the procession of European philosophical thought."

Since the 8th century, China has consistently rejected the adoption of organized Christianity. As Antonio Banfi has put it, this resulted from the highly organic structure of Chinese humanism, which viewed with distaste a religion which placed so tragic an accent upon transcendence, and was therefore inevitably so dogmatic and ecclesiastical. At the same time, the modern science that was offered by the Jesuits was enthusiastically received, but the Chinese realized that modern science was not something essentially Western, but something essentially new. They also realized that it had nothing intrinsically to do with Christianity. Moreover, the imperialistic behavior of the Western powers, with its overtones of racial pride, and most recently the self-caricature of Western mores offered through films and books, have made the preaching of missionaries seem hypocritical.

On the other hand, the revolutionary socialism of the great European bourgeois revolutions went over into Chinese culture without the slightest obstacle because it had to do more clearly with the fundamental needs of men incarnate in their material being. On such grounds China and all Asia could accept European influence unhesitatingly; what the Chinese appreciated was the ideal of liberty, equality and fraternity. All the pioneers of modern China, including Sun Yat-Sen and the early Kuomintang, exerted a powerful force in the modernization of the country. The merit of marxism in Chinese eyes was that although it had originated in Europe it, like physical science, was intrinsically universal and capable of application to Chinese social history.

China had a most remarkable scientific development in ancient and medieval times, but of modern science there was none, from the 17th century onward. The great question which impelled Needham to devote himself to the history of scientific development in China is this: Why did the rise of modern science take place only in Europe and did not occur in East Asian civilization in spite of so many great Chinese achievements in the past in the scientific, mathematical and technological fields? Behind this lies another question, Why, before the Renaissance, in the period from about -200 down to about †1400 was China so far ahead of Europe? Also to be answered is the question why was bureaucratic feudalism so much more efficient than Hellenistic imperialism or medieval Western feudalism in applying science to human affairs—very often, in a way, applying a theoretical science that did not exist? In the absence of deductive geometry as developed by Euclid and Appollonius, it was in China, not Europe, that the invention of the mechanical clock was made. This and other developments have been thoroughly presented in *Science and Civilization in China.* All of this seems to indicate that the society of the Chinese Middle Ages could not have been so despotic as some would have us believe, for without an element of freedom the innumerable inventions and discoveries of those ages would be inexplicable.

In conclusion Needham writes: "It has been my aim in the foregoing pages to provide a background for thought on contemporary China . . . under the leadership of the Communist Party. . . . Its work can hardly be understood by Westerners unless they bear in mind certain age-old features of Chinese culture of which too often they are lamentably ignorant. . . . The fact is that the rest of the world needs to learn, with all humility, not only from contemporary China but from the China of all time, for in Chinese wisdom and experience there are medicines for many diseases of the spirit and indispensable elements of the future philosophy of humanity."

—E. B. Sellon

NEWS AND NOTES

THE world presents itself to sense perception naively in three aspects: matter and energy, life and its functional forms, and man and his works. Until quite recently it seemed to be impossible to get at a common source for these three appearances which would satisfy the demands of science and at the same time confirm the unique qualities which identify these aspects of reality as genuine categories. If one tried to adhere to a philosophy of nature which would conform with known and recognized scientific data, it seemed that man had to be reduced to the level of his animal reflexes, and that life itself was an ephemera resolvable into its chemical elements. Thus, of the three aspects of nature, only one was considered to be really a universal: matter and energy. Living creatures and man himself seemed but an afterthought of nature, accidentally produced and easily swept away. Hence in both space and time the superior position of matter and energy appeared obvious; the philosophy of materialism reigned supreme. Although living forms were seen to effloresce in evolution into myriad shapes of delicate beauty and increasing complexity and sensitivity, in the end the fate of life was that it should vanish utterly, fading back in individual, in species and in totality into chemical and energetic monotony.

Under these conditions it was inevitable that life should be inexplicable and its definition circular. What was protoplasm was alive, and what was alive was made of protoplasm. Similarly, whatever man uniquely may be — notably, a being conscious of self and in some measure reflective, conceptualizing and self-directing — this also had to be accepted in simple piety as seeming to have no relation to all that went before in the evolution of the globe.

But fortunately for all of us, this conception has gradually been eaten away from within. The increasing subtlety and complexity which is now perceived to be the real nature of matter make a naively mechanical view of the universe impossible. The change has come about through an almost unbroken sequence of developments in scientific method itself. With a few brilliant exceptions, such as that of Newton, the science of the past was observational and analytical. The increasing ability to observe and accurately classify facts about the material world, and to perform repeatable experiments which justified the hypotheses based upon the observations — these seemed to be the secure foundations of classical science. Only a few men of genius had been able to formulate and mathematically structure a concept which revealed the integral order of nature so as to sweep together old and new data which proved the authority of the structure. But in the middle of the nineteenth century there began a major development in this mode of scientific thought: the method which is known as deductive-exact. A series of spectacular and ever-accelerating explorations into the properties of space and space-time have been achieved by means of a method which is prompted by direct sensory perception of the material world, but takes its proper start from the ideal world, with postulates. Observational techniques continued, of course, for purposes of verification. But access to those underlying principles of order in nature which lie deeply buried beneath the surface heterogeneity was now won by employing pure thought. The greatest achievements in modern science, associated with the names of such men as James Clark Maxwell, Max Planck, Albert Einstein and Erwin Schrödinger, have thoroughly established the validity of the deductive method, and have verified the reality and the ultimate supremacy of nonmaterial fields. That which is most lawful in nature, it may now be said, is found in its nonmaterial groundwork.

The philosophical implications of this kind of science are obvious. The universe which it has opened up to us is now to be seen as metaphysical, and its causal origins are most certainly ideational *au fond.*

At present the treatment of the forms of living creatures so that their relationship to non-material reality may also be fully established constitutes a research program so novel as to daunt us. Only in respect to genetics has postulational and mathematical theory begun to supply some knowledge of the underlying orders of plants and animals. Nevertheless, it is possible as of today to break out of the circular definition of life referred to above, and begin instead to think of the origin of both the living and the so-called nonliving as a consistent sequence. Physics has presented us with entities which can hardly be said to have any material reality at all and yet which form the universal substrate for all the phenomena of this sensed material world. Planck's quantity, "a little energy for a little while," lies well over the threshold of the substantial physical world. There is also the photon, a particle without rest mass, which is nevertheless exquisitely devised to discharge in chlorophyl its signal for life from the distant sun. Electrons, protons, atoms, molecules, crystals arise from the continuum and are held within it. Truly it is because of this that they form a continuity. That there is a bifurcation of this series which leads off in what seems to be a new direction by long chain molecules of amino acids and the like into protoplasm, cells, tissues and organisms, in no

sense destroys the fundamental unity which we can now attribute to matter and energy and life and functional form.

As for man, we may seem to be a long way from deriving ourselves from the Universal Ground. But the mere fact that we have succeeded in unlocking the secrets of the non-material origins of matter and of life with the keys of geometry and number seems to imply that it is only a question of time before these same intuitive and intellectual instruments will help us to solve the third mystery. The task now before us is to trace man's consciousness, his reflective, imaginative and aesthetic resources, back to their origins in that one universal and proto-ideational reality which science now has proven to give rise to the phenomenal world.

The presence of this reality or ultimate Ground has long been known to man by other means. The wisdom of inherited culture, both of the East and of the West, has universally and in common terms described the unity and ultimate nature of this reality, and man's relationship thereto. The unique situation today is that the intuitive, subjective and aesthetic perception of reality which man has always been able to appreciate as a participant, can now be conjoined with a rational understanding of the ways in which that reality gives rise to and incessantly engages with the manifested world.

MAIN CURRENTS was founded in 1940 to keep watch over these extraordinary developments. Because its aims, though extremely broad, are quite specific (viz our masthead), the journal has been a rallying center for those who were deeply discontented with the failure to restore integrity to the educational experience, despite sincere endeavors by hundreds of equally aroused men and women conspicuous in education. Consequently there was organized the Foundation for Integrated Education, through which a fresh endeavor might be begun to restore unity to the sciences and humanities through a consensus which is clearly possible in the epistemology of deductive-exact science. Thus MAIN CURRENTS has been able to function as liaison with increasing numbers of people who realized that in the end the solution for our problems must lie in a philosophy of education that is spiritual and metaphysical in essence, but thoroughly justified from beginning to end by its method and its scientific content. For only a philosophy of this kind would be acceptable in secular educational systems, such as now prevail in the United States, England, India, Australia and elsewhere, including Russia.

The work of the Foundation has proceeded quietly but steadily in the years since its inception, and it has recently been strengthened by a research grant from the Rebekah Harkness Fund of the William Hale Harkness Foundation. As this is being written, a program of research, publication of motion pictures, and other teaching materials is under way. Very shortly, readers will have access to a book based upon a consistent exposition of the philosophical implications of modern physics which was given in lectures by Henry Margenau, Higgins Professor of Physics and Natural Philosophy, Yale University, co-sponsored by the Foundation for Integrated Education and the New School for Social Research. The article on "Causality" which appears elsewhere in this issue is a chapter in that forth-coming book. Other volumes by F. S. C. Northrop, Sterling Professor of Law and of Philosophy, Yale, and by D. H. Andrews, Baker Professor of Chemistry, Johns Hopkins, are also in preparation. These all employ what is essentially the same epistemology and apply it with scientific clarity into various practical operating areas, such as government, ethics and aesthetics.

Thus MAIN CURRENTS is not merely a collection of miscellaneous papers, but a sustained exposition of one central thesis, approached from many divergent points of view, out of many different cultural experiences. The very existence of the magazine has evoked contributions from like-minded, if not identically-oriented individuals. Therefore, however diverse their themes, all have bearing upon the essential unity and coherence of man, life and nature, and their common origin in the non-material real.

—F. L. Kunz

The comment (on page 14) upon Dr. Win's article on the Burmese language raises the interesting question of the influence of the Indo-European modes of thought upon a people such as the Burmese. That most people are endowed with the ability to use unstructured concepts is witnessed by the existence of language. That they may import and use naively terms embodying postulationally derived concepts is also evident. To conceptualize is to be human. It has been said — by Spencer and Gillen, I believe — that Australian indigenes had many words for ants, one for each variety and none for the species, "antness." But even if this be so, are we so righteous as to suppose that in prehistoric conversations carried on in Wooloomooloo the gentlemen concerned did not know an ant from a kangaroo?

Major methodological problems in the study of religion by behavior sciences will be the principal theme of the twentieth meeting of the Society for the Scientific Study of Religion, October 28-29, in New York City.

The meeting will take place at the Interchurch Center, 475 Riverside Drive, New York City. Further information concerning the program may be obtained from the secretary, James E. Dittes, Yale University, 409 Prospect Street, New Haven 11, Conn.

REVIEWS

Lacks in the Law

THE books of F. S. C. Northrop, Sterling Professor of Philosophy and Law at Yale University, are building up a consistent doctrine for a philosophy of public affairs. The level at which he made his initial attack on the whole complex was primary. In *The Meeting of East and West* he raised and answered those questions about the knowing process which appear when epistemology is worked out in quite contemporary terms. That is to say, we live now in an age when supersensory domains have been endowed with reality. Indeed, the sensed organizations which we are still calling matter derive their appearance and behavior from such domains. Therefore the theory of knowledge for today must give a clear priority to structured knowledge of the deductive-exact type, since this is what makes most certain our understanding of the supersensory domains, themselves. In that now classic work (lately reissued, I believe in paperbound form) the start was not only made, but the program carried through to the point where juncture was made with those societies, and especially India, whose inherited insights show that by means of their own they had arrived at some knowledge of the continuum. The sciences and the arts appear in that work as aspects of experience possible and natural to a healthy person, and not as a rational and realistic and willful and individualistic expressionism unrelated to one another. *The Logic of the Sciences and the Humanities,* and also the work Northrop edited, *Ideological Differences and World Order,* are a continuance of the program which establish Northrop in the very front rank of the few philosophers who have tried to carry out a consistent analysis and comprehensive program of application.

Having set forth the basis, Northrop is now concentrating on law. The most recent book, *The Complexity of Legal and Ethical Experience* (Little, Brown, Boston, 1959, 331 pp. and index, $6.00) is a fascinating analysis and a dismaying revelation of the inconsistencies and unworkabilities of legal systems today. Northrop examines natural law, jurisprudence, philosophy, positive law, normative criteria, and builds up in the reader the conviction that the author is entirely at home in all the vast complex — whether derived from the Vedas and Manu, from Madison and Jefferson, from Sir Henry Maine and Mr. Justice Black — and that law and ethics could be brought into conjunction if what is and what ought to be were studied in the same terms and by the same method for jurisprudence as they are by Northrop himself for social or scientific or any other cultural endeavor.

We must regard this work as introductory to a volume of applications, and the two taken together should be inexpressably timely. For there are many critical issues at law before us. We in this country are the heirs to a system which went beyond the English practice. In England the solemn declarations of right which formulated aspects of freedom were directed at the tyranny of the Crown. The immediate beneficiary was in every case not the subject directly, but first the barons (Magna Carta) and latterly Parliament and finally the Commons. Our percipient Founders saw that this would not do for us; hence our own Bill of Rights has been directed at the Congress, by name. The system is admirable, but the philosophy of nature which prompted it was encrusted and paralyzed in the nineteenth century. So today Congressional Committees encroach on Court functions in certain ways, and Executive powers have been used to set up quasi-juridic functions which also tend to usurp Court functions. Not only has our system decayed, but it has been copied in part in countries (India, for example) in that very particular, countries which are struggling to secure their freedom amid adverse circumstances which do not burden us. Meantime International law is also needed. Where do we get the insight which will enable us to systematize the meanings of supersensory reality and embody for man that part of it which applies to him and his society?

In an election year one longs for an outcome which might bring into power cultivated men, free and uncommitted men, who could work together with others like Northrop to get on firm ground. Certainly he is doing his part with a competence which derives from mastery and insight. One could not ask for more, just now, than the election of a cultivated, thoughtful man to the presidency, the restoration there of some humor and scholarship, and the proper use at those levels of researches such as these.

—F. L. Kunz

The Proper Face of Death

"IN the presence of death, Western culture, by and large, has tended to run, hide and seek refuge in group norms and actuarial statistics. The individual face of death has become blurred by embarrassed incuriosity and institutionalization. The shadows have begun to dwarf the substance. Concern about death has been relegated to the tabooed territory heretofore occupied by diseases like tuberculosis and cancer and the topic of sex. We have been compelled, in unhealthy measure, to internalize our thought and feelings, fears, and even hopes concerning death." Thus the editor, Herman Feifel, introduces *The Meaning of Death* (McGraw-Hill, N. Y., 1959, 351 pp., index), a collected effort to face death honestly with knowledge currently available.

Part One contains theoretical outlooks on death and includes articles by Carl Jung, Charles Wahl, psychiatrist, Paul Tillich, the outstanding theologian, Walter Kaufmann, professor of philosophy at Princeton, and Herbert Marcuse, professor of politics and philosophy at Brandeis University. The variety of disciplines and backgrounds of the authors is typical of the book. Other sections deal with studies done on developmental orientation toward death, the death concept in cultural and religious fields, and some clinical and experimental studies on attitudes toward death held by various groups. These are written by

psychologists, sociologists, anthropologists, medical men, philosophers, ministers.

One is impressed by the amount of knowledge available about death. Insights gained by studying death as treated in modern literature and art and also the amount that can be known about the ways funeral rites in various cultures help the bereaved handle their grief unexpected avenues. But the experimental work in particular encompasses much more information and suggested ways of gleaning further information than would have been expected. The knowledge of doctors who deal with dying patients, attitudes of dying patients themselves, view points of various age groups, religious groups, and of mentally ill patients, suicide notes, studies of unexplained sudden death in animals and men, all these and more are tapped as sources of knowledge concerning the mystery of and anxieties about death. The psychologist Gardner Murphy, who ends the book with a discussion of its contents, feels that, "The things that I have brought away from this book that are most precious to me are the empirical materials yielding light on the richness of factors which I thought were rather thin and the ease of getting data, which I had formerly thought to be pretty near unattainable." One such finding is a study by Irving Alexander and Arthur Alderstein comparing attitudes toward death of a religious group with attitudes of a non-religious group.

Jung in his article, "The Soul and Death," does not use empirical findings as the basis for what can be known of death. He argues for the possibility of existence beyond time and space. Though he offers experimental findings on telepathy and extra-sensory perception to support this view, he appeals primarily to a deeper internal knowledge. "If, from the needs of his own heart, or in accordance with the ancient lessons of human wisdom, or out of respect for the psychological fact that 'telepathic' perceptions occur, anyone should draw the conclusion that the psyche, in its deepest reaches, participates in a form of existence beyod space and time, and thus partakes of what is inadequately and symbolically described as 'eternity' – then critical reason could counter with no other argument than the *non liquet* of science. Furthermore, he would have the inestimable adavantage of agreeing with a trend of the human psyche which has existed from time immemorial and is universal in incidence."

Paul Tillich, too, in his article "The Eternal Now" appeals to our sense of eternity. He speaks of it as a reality which can be alive in one's immediate experience, making a sharp distinction between eternity and an endless future. He argues that the latter is only a superstition when regarded as a reality beyond death. Speaking of the eternal he says: "It is the eternal 'now' which provides for us a temporal 'now.' But sometimes it breaks powerfully into our consciousness and gives us the certainty of the eternal, of a dimension of time which cuts into time and gives us *our* time."

These courageous thinkers have touched on the possibility of life after death. However, the book as a whole mirrors the state of our culture with regard to questions of ultimate concern. Our unwillingness to undertake the building of a unified philosophy which implies man's ultimate destiny from an understanding of his essential nature is most apparent. On the whole the articles are filled with useful and interesting information, but none of the contributors really tackles this philosophic question which, after all, is the central issue.

–S. J. Nicholson

The Context of Psi Cognition

A close examination of the interrelation of Indian traditional psychology and modern parapsychology has long been needed. In *Psi Cognition,* K. Ramakrishna Rao furnishes a first thorough discussion. (Tagore Pub. House, Tenali, India. Date and price of publication not furnished.) The author teaches at Audhra University, and is unusually well-equipped to give an account not only of the pertinent passages in the *yoga darsana* but also to present the Indian epistemology (*nyaya darsana*) and its correlate, the point-atom metaphysics of the *Vaiseshika.* He includes the necessary material from the *mimansas* (critical philosophy of Indian theology), and from Buddhist and Jaina schools. He then turns to the views of certain European philosophers, who dealt with these matter (Spinoza, Kant and Bergson) and, with this before the reader, he examines one by one the recent and contemporary work and theories of Whately Carrington, H. H. Price, G. N. M. Tyrell, J. Hettinger, J. Ehrenwald, J. B. Rhine, R. H. Thouless, B. P. Weisner, and S. G. Soal. All of this, and an introduction by Rhine himself, plus a good bibliography and an index, are done inside two hundred pages, a remarkable achievement.

With so much so well done one is reluctant to make any criticisms. Certainly as it is the book is unique. Perhaps a clear exposition of the *Sankhya's* identification of the world-stuff as mind (*mahat*) and the relation of this root-principle to modern force and metric field data and theory would have rounded out a remarkable performance. Still, a host of readers, bored with generalities about Indian thought, will be grateful for what is offered.

Besides the wealth of source material, the Western educated will probably be struck by the naturalness to Indians of telepathy, clairvoyance, precognition, and the rest of the complex which has been opened up by studies of psi cognition and is now serious scientific business in parapsychology. That the subject is in the West as yet almost entirely empirically based is notorious. It is reasonable to hope that as this little work gets known and others come along, research workers of East and West will begin at last to conduct experiments carefully designed to lead to good operable theory and to connections with the general body of established scientific thought. If this development occurs, *Psi Cognition* may well prove to have been a turning point, not only in science but in the needed more precise relating of Indian thought, as a whole, to contemporary science.

–F. L. Kunz